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(71)(72) Applicant and Inventor: DELAIN, Robert [US/US]; Post Office Box 61022, Virginia Beach, VA 23466 (US).

(74) Agent: BUTLER, F., Prince; Griffin, Butler, Whisenhunt & Kurtossy, 775 South 23rd Street, Arlington, VA 22202 (US).

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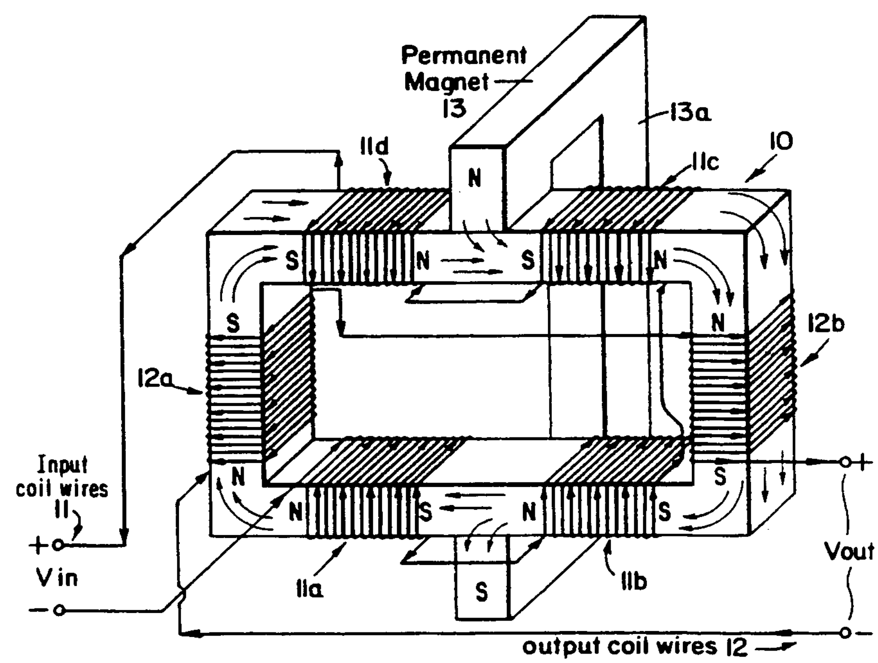

(57) Abstract

An inductive device comprised of a transformer including a core (10) of amorphous metal enhanced by a permanent magnet (13). A primary winding, including coils (11a-11d), pilots fluxes about the core (10), thereby enabling increased electrical energy output.

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ENHANCED TRANSFORMER

BACKGROUND OF THE INVENTION

Since Faraday, we know that the motion of magnetic flux may be used to generate electric energy. It is not well known that attempts at electrical power generation without physical material motion (non-motional) have been achieved with limited efficaciousness. These endeavors utilize electromotive force to control magnamotive force universally, effectually non-motional thus depending on the relative motion of a changing flux density. All of these attempts have failed to pay adequate attention to the hostile environment thereby created and the resulting hysteresis loses have eventually induced degradation of the permanant magnets (P-M). The fundamental principles and history of electrical generation in the solid state format using permanent magnets begins with Hans Coler's "Stromerzeuger" & "Magnetstromapparat" research in Germany 1936-1945, but, is illustrated and best summarized with the prior art cited here:

An electromagnetic converter disclosed in U.S. Patent (4,077,001) to Richardson discloses a reluctance control device where core reluctance is varied via pole pair pattern switching using P-M flux as a reference, not a source. Input power flux follows the paths of least reluctance often external to the core which assures higher energy expenditures. It has high frequency uses and multiple path changing choices.

U.S. Patent 4,006,401) to de Rivas discloses a saturation blocking device of high leakage and high power consumption. Here flux switches to the least reluctant (unblocked) return to the magnet. All available P-M (max) flux is switched each cycle.

D.T. 1488837 (West German) discloses a recapitulation and variations on themes from S. Bosco-Maivica's, the author's, prior patents of the same device.

Subieta-Garron (U.S. Patent 3,368,141) discloses a flux path switch device utilizing a bifurcated shoe, there being two paths for magnetic flux. Means to intensify electrical current output by adding the flux of a P-M to that induced in a transformer is disclosed for this device. Subieta-Garrow discloses a sound concept with good features, with multiple output coils and attenuating local hysteresis with least flux angle, which thereby extends the lives of armatures for P-M's. This device is limited only by its central single element control, which limits it like the limit of a single control element in an electron beam tube (or magic eye) as compared to the multi-element dual axis controlled cathode ray tube (CRT deflection) which followed and surpassed it.

British Patents 765,447 and 765,448 (which have basically the same information as D.T. 1,488,837 (West German) mentioned above disclose magnetic flux varying devices for controlling P-M or electromagnetic (E-M) flux by alternately augmenting/inhibiting magnetic pole pairs. These patents use ferrous shields and paths with electromagnets retroflexing P-M flux, which is shunted through additional reluctance and secondary coils. P-M hysteresis losses are ignored, thus these devices provide only short term gains.

It is therefore an object of this invention:

to increase (enhance) transformer output power;

to utilize P-M's as an added flux source;

to utilize P-M's as a driving force source;

to utilize P-M's as a flux and force source that is not consumable;

to utilize P-M's as an electric energy source (without moving parts);

to generate electric energy from P-M's for electronic devices, etc;

to generate electric energy from P-M's for electronic devices, etc; and

to gain the utility of electricity without hydro/thermo dynamic inputs.

It is also an object of this invention to move out of thermodynamics dependence realms by: not burning oxygen, not having a heat cycle, not producing great heat, not requiring fuel, not having mechanical conversion or mechanical motion. Thus it has no waste products and is non-polluting.

It is a further object of this invention to eliminate losses due to useless motion, eliminate losses due to the heat of physical motion, eliminate losses due to friction, and reduce I^2R losses due to eddy current heating.

It is yet another object of this invention to provide a device for transmitting energy in which all parts are salvageable, all parts are recyclable, and all parts are renewable. It is an object of this invention to provide such a device having a completely solid state design that is solid state compatible and providing a useful release of P-M force and flux energy as electricity.

SUMMARY

An inductive apparatus comprising a transformer core of engineered amorphous metal alloy or magnetic metallic glass, is flux-enhanced with protected

permanent magnets. A primary (DE Lain deflection Yoke) of a bidirectional flux cynosure collimator, or dual function deflection device of (exitation/deflection) coils, is uniquely configured to gate, sum and pilot dyad electromagnet and permanent magnet fluxes about a pseudo bifurcated flux conduit, thereby enabling increased electrical energy output via duad utilization windings that offer options of AC and/or DC. De Lain deflection buttons, antipodal to dual magnets, allow duplex flux influxion to augment and intensify gain further. Another embodiment incorporates superconducting pellets. Adjunct electronic control micro-circuits, driven by permanent magnet (permag) power, allows a completely solid state design for a environmentally benign, pollution free, lubrication free, fuelless, cybernated electrical generator having no moving parts which is driven by maintenance free permanent magnets.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is described and explained in more detail below using the embodiments shown in the drawings. The described and drawn features, in other embodiments of the invention, can be used individually or in preferred combinations. The foregoing and other objects, features and advantages of the invention will be apparent from the following more particular description of a preferred embodiment of the invention, as illustrated in the accompanying drawings in which reference characters refer to the same parts throughout the different views. The drawings are not necessarily to scale, emphasis instead being placed upon illustrating principles of the invention in a clear manner.

Fig. 1 is a new configuration for the fundamental transformer core and coils, DeLain

deflection Yoke - primary, showing additional magnet pole polarity points created, duad secondaries.

Fig. 2 enhanced transformer with half adder P-M external, direction of E-M flux cw, polarity directed P-M flux cw half core selected lobe on.

Fig. 3 enhanced transformer with half adder P-M internal, direction of E-M flux cw, polarity directed P-M flux cw half core opposite lobe on.

Fig. 4 enhanced transformer with full adder dual collateral P-M's direction of syncretized flux E-M/P-M's ccw bilobate ET-2, plus deflection buttons.

Fig. 5 enhanced transformer (symbolic) DeLain Deflection Yoke - primary, protected P-M's, core, De Lain deflection buttons, duad coil - secondary.

Fig. 6 permanent magnet protection methods using coil pole polarities directionized by current and helix tenor laws, passive enantiomporphic coil pair, active coil and bridge, grounded shield can covers.

Fig. 6A single suppression coil and diode and/or special purpose diode;

Fig. 6B double suppression coils with diodes, an Enantiomorphic pair.

Fig. 6C Triple suppression coils with bridge and spike diodes.

Fig. 6D double suppression coils with diodes and sleeve shield can.

Fig. 6E suppression coils, diodes, can shields, active coil and bridge.

Fig. 6F utilization coils with shield can covering.

Fig. 7 electro magnetic coil conduct showing relevance and dependence of coil current plus helix tenor in directionizing pole polarities, a pair of Ehantiomorphic coil(s) identified.

Fig. 8 enhanced transformer magnetic circuit flux loops relevant to ET-1.

Fig. 9 block diagram of cybernated "PERMAG" generator showing start options, ET-2, feedback loop stages.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A quality transformer core suitable for this invention should have low retentivity and coercivity, high resistivity, high-gain permeability and the highest rectangularity meaning a magnetic hysteresis curve approaching a rectangular pattern; plus maximum resistance to heating, both thermal and inductive. The best (commercially) available materials engineered for this purpose are the tape wound magnetic metallic glasses or amorphous metal alloys. Other standard transformer core materials -- silicon steel, trade name alloys, ceramics, ferrites, etc. can be used if some other than stated advantage prescribes its use.

The typical rectangular core, (Fig. 1#1) single unit toroidal like, with said improved core characteristics is recommended. Encapsulated tape cores cut into mating pieces, rolling direction of the tape being maintained, or a true torus, or section assembly of L, C, or I parts making up arms that form a magnetic circuit, should be a second choice. A one piece gapless core, best guides, collimates, and confines all magnetic flux to its interior bidirectional track. The basic core used is a single magnetic flux loop -- series circuit. Coils are wound on it with a toroidal winder to reduce leakage and gap loss.

Transformer Primary Windings

The primary or input winding(s) of coupled series inductances, is one coil wound in a minimum of four (4) appropriately spaced sections, or four (4) coils wired series aiding. Each segment interval, magnet like, adds two more fiducial power points (unseen magnetic poles) in an otherwise continuous circuit of

magnetic flux. This new change, said dual function yoke(s), (fig. 2#2) reconfigures a fundamental transformer sacrificing some flux linkage/leakage to position magnetic pole points. Strategically placed poles afford exacting and critical, cynosure control of adjunct added P-M flux. Each of these coil(s) should be the same as to wire gauge, turns, insulation and flux generating capability to achieve overall balance. They can also be wound to compensate for (or create) imbalance and assure better flux control. All coils are fixed and immobile relative to the core, thereby resisting the mechanical stress of all Lorentz torque producing forces.

Transformer Secondary Windings

The secondary or utilization windings are in two locations relative to the core or primary coils. (Fig. 1#3). Secondaries are positioned whereas to capture the mutual induction of summed electro-magnet and permanent magnet fluxes. Wound as one or more separate coil(s), in two or more positions in fixed relation to the core, a secondary may be wired to function as:

1.3a series aiding coil(s) for max voltage output AC or DC (using bridge rectifier)

1.3b parallel aiding couplet coil(s) for max current output AC or DC

1.3c two independent outputs -- one A C, -- one D C

1.3d an AC frequency tuned circuit output

1.3e multiple combinations of 1.3a thru 1.3d where two or more output coil(s) are used.

CALCULATING I/O OF THE FUNDAMENTAL TRANSFORMER

The transformer does not create or destroy energy, nor does it convert energy from one form to another. It only transfers electrical energy (force) from the primary(s) to the secondary(s). Transformers

accomplish transmission of input electrical oscillations to output current/voltage variations via the mutual induction of linkage flux (ϕ_m) fluctuations, with superior isolation impedances and all without material motion. Magnetic flux is the medium, mutual induction the means, that permits isolation, transfer and transmission of power and energy. Usually, from input to output, the transformer changes the ratio of voltage to current but their product remains constant throughout the process, that is the power $P = I\ E \cos(a)$. The enhanced transformer does likewise and more. One of the many significant differences between a transformer and the enhanced transformer configurations is the primary, its number of magnetic poles and pole locations -- but without P-M's in place this power equation and standard transformer textbook calculating tools apply. (Fig. #1).

ZERO CASE:

For transformers --(also Fig.1) DeLain deflection configuration(s) --operating on the linear portion of the hysteresis curve, output may be determined with a dimensionless ratio factor times the input. This proportionality called the coefficient of coupling and designated K, is found by dividing output by input. Therefore, power out = K times power in and power out is always less than unity ($K<1$).

For transformers with a core the usual approximation is $K=.95$ or higher.

For transformers without core a usual approximation is $K=.65$ or greater.

For the DeLain deflection configuration the difference .3 is split $\pm.15$.

Using this conservative approach that depreciates the superior core of the Enhanced Transformer and emphasizes the linkage losses gives $K_{e-m}=.8$ as electromagnetic efficiency making .2 the transformer loss. Importantly, the flux ratio K or

coefficient of coupling accurately reflects the magnitude of flux circulating internal to the transformer's core, it is that which determines induced output. Here $K = K_{e-m}$ and $K_{e-m}<1$.

In terms of flux:

$$K_{e-m} = \frac{\phi_{mut} \text{ for Mutual or Actual flux}}{\phi_{max} \text{ for Maximum or ideal flux}} = \frac{\phi_{e-m} \text{ out}}{\phi_{e-m} \text{ in}}$$

Where:

$\phi_{mut}=\phi_{max}-\phi_{l}$ = linkage flux minus leakage flux = ϕ_{e-m} out

Where:

$\phi_{max} = \sqrt{L_p \times L_s}$ = linkage flux before losses = ϕ_{e-m} in

Where:

L = coil self inductance, p = primary, s = secondary and l = leakage

Accordingly, the linear relationship $NI_{out}=(K_{e-m})NI_{in}$ = (.8)$POWER_{in}$. This lower than normal efficiency will be changed dramatically with Permanent Magnet Enhancement.

P-M Enhanced Design Added to
Fundamental Elements

The Transformer is Energy Enhanced with a Permanent Magnet

PERMANENT MAGNET - A magnet that retains its magnetism indefinitely after once being magnetized. This definition from the Reader's Digest Encyclopedic Dictionary - is one I like.

PERMANENT MAGNET - A ferromagnetic body that maintains a magnetic filed <u>without</u> the aid of external electrical current. From the IEEE Standard Dictionary of Electrical and Electronics Terms.

I might add it's a generator of constant unidirectional magnetostatic flux field having no source or sink. That is, no external source yet

continuous output without input - INDEFINITELY. The Force and energy stored in the flux field, in potential energy (PE) form, may be increased/decreased depending on the permanent magnet (P-M) material used and the degree of internal domain alignment within said ferromagnetic material. To date, the highest energy product materials are engineered from Neodymium Iron Boron (Nd Fe B) or the like (NDFeBDy, etc.) and for the purpose of this invention the maximum energy material will have the desired best properties. Other magnet materials (of lower energy product -- rare earth, alnico, ceramics, ferrites, etc.,) may also be used with the expected reduced output result or desired ecomonic advantages. A measure of this P-M flux field energy is expressed on a (manufacturer's) curve as an energy product (BH)max or a magnetization hysteresis curve where magnetization force vs. flux density (or H vs. B) is plotted for the material being utilized.

The (P-M) flux contribution to the total flux in the circuit may be determined with the aid of these curves. On a B-H hysteresis curve, the desired B value lies where B residual (Br) resides. It's read directly from the curve where H=0 (zero) and the remanence flux value is positive $Br=u_0Mr$. Alternately, the point on the curve intercepted by a line from the origin with slope (B_{max}/u_0H_{max}), or directly from the (BH)max external energy product curve at its knee where B&H are both maximum. Either way this Br value times the magnet face area (A), is the flux density Phi, $(\phi_{p\text{-}m})$. Therefore $BrA=\phi_{p\text{-}m}$ is the force and flux available from the P-M source (continuous output without input -- indefinitely). A P-M is a power generator.

The P-M(s) are fitted to the core, but with precaution to electrically isolate it/them from the

core, pedestals are used (Fig. 4) thereby creating a gap: a maximum or macro-gap for current density yet dualistically a minimum or micro-gap for flux density, certified current opaque and flux transparent. Thusly, poles are placed interjacent coil collars -- consequently yoked by them. The collars being themselves betwixt utilization windings. So situated, the core's magnetic circuit is bifurcated into pseudo lobes (Fig. 2). The P-M lines of flux enter the core directly, conduced by the characteristics of ferr-magnetic materials (N-pole induces S-pole and S-pole induced N-pole; recognized as the principle of magnetic induction). This induces P-M flux force lines to influx the core conduit and to be maintained there under all conditions, (the core is a keeper).

Action of the permanent magnet flux

The P-M(s) is/are fixed and cannot move, so its lines of flux force are coerced by the "Principle of Poles", a most fundamental rule: Charges (poles) of like sign repel. Charges (poles) of unlike sign attract. This is a derivative of the more comprehensive phenomenon -- the force exerted by one pole on another is proportional to the product of the poles and inversely proportional to the square of the distance between them.

This is the primary force law with many expressions.

COULOMB's LAW

$$F = C \frac{Q_1 \times Q_2}{D^2}$$

NEWTON's LAW

CAUTION

Many Conversions systems abound these (confusion) factors are:

- -Pole units
- -English & Practical English units

$$F = G \frac{M_1 \times M_2}{D^2}$$

-CGS unrationalized & rationalized
-MKS unrationalized & rationalized
-SI Units

MAGNET POLE LAW

$$F = u_0 \frac{P_1 \times P_2}{D^2}$$

I warn only the novice in these matters as we all know those skilled in the art have traditionally used the best system

"Thus it is settled by nature, not without reason, that the parts nigher the pole shall have the greatest attractive force; and that the pole itself shall be the seat, the throne as it were, of a high and splendid power."
-- Dr. William Gilbert's, De Magnette (1600) AD
DeMagnette recognized its haecceity then, - now DeLain applies its quiddity.

The direct (non-motional) utilization of P-M force & energy is built here (from equations UP) on the firm foundation of this general force law ...$F = c(P1xP2/d^2)$ which governs force attenuated by distance and the constant of the transmission medium, force continuous, ever ready to spring forth when its equilibrium is disrupted. Force without energy consumption.

This is the <u>CAUSAL FORCE</u> herewithal.
Note, this is <u>not</u> a reaction/resultant force as ...F = ma or e= Ldi/dt+Idl/dt.
It - is intrinsic force that never opposes itself, it - is inherent action initiating linear force, like lighting it too - is explosive, self starting and fast acting. It - is this device driving, innate P-M force between poles that impulses & energizes the ENHANCED

TRANSFORMER. The yoke is its pilot.

2.2 THE DELAIN DEFLECTION YOKE IS THE PRIMARY WINDING

One (1) YOKE SYSTEM IS THE INPUT (fig.#1)
TWO (2) COILS COLLAR ONE P-M POLE (fig.#2)
TWO (2) COLLARS YOKE ONE P-M (fig.#3)
TWO (2) SECONDARY COILS ARE OUTPUT (fig.#1-5)

The DeLain Deflection Yoke or flux cynosure collimator is a single input inductor divided into a four (4) section primary winding that yokes the permanent magnet(s) and controls the P-M flux. The yokes P-M plus the utilization windings all surrounding the core material comprise the basic enhanced transformer I/O system (fig.2,3). The transformer with the P-M located as depicted enhances the output by increasing the directionized and total flux density in the core. This P-M flux density contribution $\phi_{p\text{-}m}$, once within the confines of the core, has its force directed, controlled and compelled, plus it's made to enhance the self-induction input flux $\phi_{e\text{-}m}$ by means of the DeLain DEFLECTION YOKE, so this efficaciousness in the mutual induction fluxwave transformation via utilization windings produces electric current output; over the unity of current input. --Now possible with a permanent magnet source.

2.2 Action of the deflection coils

In this invention, pole (P_2) is an electro-magnet (E-M), and the strength of its poles varies in accord with the current thru its inductance, P_2= NI.

$I = \frac{e}{r}(1-e^{-tr/L})$ recognizable as the non-linear L or C time constant curve. Other than the self-induction of the DeLain deflection yoke coils, nothing else is induced into the yoke coils. The direction of current

through the inductances determines the polarity of each pole site. The yoke collar junction is a quasi P_2, as it has both a N-pole & S-pole acting as a unified pole. There can be no negative sign or wrong sign at the P-M collar junction--as desiged herein. The yoke (sayP_{2x}) directs action and enables repetition by changing the direction of forces without opposition to force. A direction vector angle change is accomplished without opposition, because for every delta of repulsion force there is an equal and opposite delta of attraction force to balance. The sum of the forces is zero. Therefore, no resultant energy is expended or required, only direction changes. However, flux waves or deflected impulses of P-M force results from the reciprocating direction changes. This action is initiated when half P_{2x}, transposes itself into P_2, then back again & again...like a crankshaft turning combustion into drive.

As a consequence of the ferromagnetic properties of the core and the polarity responsive nature of magnetic flux, the DeLain deflection yoke creates the complementing Perfect Reflector & Ideal Conductor to influence and control the direction of P-M core flux at the pole site, without material motion and without energy loss. (Like a sail boat moved by the wind, there's a hansel ride for P-M flux too, on the linear portion of the hysteresis curve of the core in either direction of the magnetic wind. This permits the virtual sea of energy in a P-M to gush out of its ocean in waves of electricity --so to speak.) That is, the input energy require to oscillate the DeLain deflection yoke (or transformer primary) is unaltered by the presence of the P-M when located as described, provided core saturation knee limits are not appulsed.

The knee point is defined to be at saturation where the slope of the incremental permeability line, $dB/dH=u_0$ is equal to +1, and it is tangent to the hysteresis curve of the core. It's designated and designed to be 100 % core flux density, though the core material will confine more flux, --but beyond the knee into non-linearity further permeability approaches zero asymptotically with increased dH and losses exponenciate accordingly.

The DeLain Deflection Yoke as the four section input winding efforms a duodirectional electro-magnetic (E-M) flux wave in the core that follows the input A C power. The momentary unidirectional flux wave of each half cycle of AC forms aiding (N-S) magnetic polarities between each of the (4) yoke coils (fig. 2,3). This bipolar magnetic condition at the site of each P-M pole controls the direction of the P-M flux upon core entry with a vice like push-pull action, enabling a small AC flux to gate, modulate, & control a larger magnetostatic (DC) flux. (Like a grid voltage controlling anode voltage gain.) Initiated by the DeLain deflection yoke, within an affluxed single lobe of the pseudo bifurcated core, the lines of force from the P-M N-pole interjoins one coil field (half a collar) that impels, propels, & expels these lines of force around the magnetic circuit. Herein, unlike magnetic lines of flux contract & interconnect their lines while tractive forces concentrate all flux lines. Its other coil field (same collar) simultaneously repels these identical force lines which are compactes by the suffusion of totally unconnected lines compressed with core constraints and the confining interface of like polarities in proximity. The conjugate collar's action at the magnet's S-pole is similar, with polarity reserved.

This part of the invention is the half adder as only half the core has P-M flux added for any half cycle of time or period. In one lobe --one flux (ϕ_{e-m}), in the other --two magnetic fields are ($\phi_{e-m} + \phi_{p-m}$) joined, summed, syncretized and act as one flux (ϕ_s) of greater strength than either alone. (fig. 2#) These coil magnet collars gate & guide this flux (ϕ_s) via the shortest, least reluctant return path to its respective pole. The E-M & P-M fluxes separate again at the opposite pole of the magnet, where the P-M flux completes its circuit and the E-M flux is left to continue around the core completing its circuit in the coils. --as per Kirchoff's LAW.

2.3 CALCULATING I/O FOR ADDED FLUX ENHANCED TRANSFORMER (ET-1)

By specification the core dimensions are fixed, this limits output such that 100 % core flux is the maximum flux still within the curve's linear portion. For P-M flux in the core (Keeper) circuit linkage flux is constant and lossless, though there may be reluctance attenuation, leakage loss is virtually zero. Therefore, P-M flux around the core circuit remains approximately unity -its $k_{p-m}=1$. So in this case, P-M flux to E-M flux percentage or flux mix ratio necessitates output gain - as the flux densities of B fields add vectorially through the DeLain Deflection yoke.

This occurs, because one magnet in the presence of another (via its field) will experience a torque that tends to twist it toward a field alignment, often expressed as T=mxB. Where T=torque, m=magnetic moment or dipole strength. The same B vector or magnetic flux density B=uH, is an axial vector (expressive of rotation, rather than a displacement --whereas the E

vector of electric current density $J=\sigma E$ is not) so it should be considered in the context of a Lorentz force, or resultant cross product of qE (electric force), and qVxB (directed magnetic force), in vector mathematics form; {F=q(E+VxB) or F=JxB} or even more generally F = I x B --recognized as Fleming's three finger rules ....FBI. Far less will known is that lorentz force has been shown to be the relativistic transform of Coulomb's law. Consequently, these mathematical methods predict the direction a magnetic field or magnetized body tends to rotate in order to align its magnetization with the applied field thereby SUMMING with it.

ONE CASE: E_{in} is: 1 $dcl \times E_{in} = \frac{dB}{dt} = \int_0^t \frac{dB}{dt} \bullet da = \phi_{e\text{-}m}$ in

Injected $\phi_{p\text{-}m}$ flux is: 2 $B \bullet da \longrightarrow = \phi_{p\text{-}m}$ in

Total core flux is: 3 (The invention) $\phi_{e\text{-}m} + .5\,\phi_{p\text{-}m} = K\phi^{sum}$ within

The power out is: 4 K del $\phi_{sum} = K(H) = \int_0^t H \bullet dl = K(POWER)in$

Here gain is inserted as K greater than (unity) one. Since $K = .5k_{phi}+.8$. Which follows from $\phi_{sum} > \phi_{e\text{-}m}$ wherein Power out > Power in. Previously, in the zero case, the E-M linkage flux to leakage flux ratio dictated output losses = .2.

and there $K=\phi_{mut}/\phi_{max}$ & $K(\phi_{max})=\phi_{mut}$.

also $\phi_{max} = \phi_{e\text{-}m}in$ & $\phi_{mut} = \phi_{e\text{-}m}out$. So k=.8

In this case: $\phi_{e\text{-}m}out = \phi_{mut}$ too ?

yes but $\phi_{mut} = \phi_{e\text{-}m}$ out + $\phi_{p\text{-}m}$ NOW,

-THIS IS THE INVENTION. It changes mutual flux, this ϕsum or flux MIX is:

$$K_{phi} = \frac{\text{Magnetostatic flux}}{\text{Magnetodynamic flux}} = \frac{\text{DC flux}}{\text{AC flux}} = \frac{\phi_{p\text{-}m}}{\phi_{e\text{-}m}}$$

= the flux mix ratio.

Then K_{phi} times $\phi_{e-m} = \phi_{p-m}$
Begin $K = \phi_{mut}/\phi_{max}$ and $K\ \phi_{max}$ in $= \phi_{mut}$ out as in the zero case.

So $K\phi_{e-m}in = \phi_{e-m}out + \phi_{p-m}$
but $\phi_{p-m} = K_{phi}(\phi_{e-m}in)$

Now $K\phi_{e-m}in - K_{phi}(\phi_{e-m}in) = \phi_{e-m}out = \phi_{e-m}in(K-K_{phi})$

Then $K-K_{phi} = \phi_{e-m}out/\phi_{e-m}in = .8$ as in zero case coupling.

Therefore $K = .8 + K_{phi}$ for the one case. K_{phi}, the flux mix ratio within core is controlled and varied by engineered specifications. For the ET-one case, any input wave period $\lambda/2$ has P-M core flux = $.5(\phi_{p-m}\%)$ because this invention confines P-M flux to a half core for any half cycle. So for a flux mix ratio equal to one, where $\phi_{e-m} = 1$, & $\phi_{p-m} = 1$, K_{phi} exist only in half the core. Therefore, only in the one case $K_{phi} = .5(\phi_{p-m}/\phi_{e-m})$. And this gives $K = .8 + .5 = 1.3$ gain.

3. THE FULL FLUX ADDER

Carefully nothing the difference in direction of flux path for a P-M internal to (Fig. 3#13b),and a P-M external to (Fig.2#13a) the core circumference with respect to any frequency period, it's apparent the half cycle reversal of the DeLain Deflection Yoke current coerces P-M flux to diverge into opposite directions for unlike magnetic poles. Clearly, it's possible to combine the internal & external magnets of opposite polarity at coincident junctions on the same core, thus having both lobes of the core influxed with P-M flux simultaneously. This second magnet introduces another increase in the P-M flux density in the core; by as much as 50 % over the single magnet Enhanced

Transformer (ET-1) for equal energy product magnets. This increases the flux coupling coefficient (k) again. It's noted that the DeLain Deflection Yoke now utilizes the polarity selective/responsive virtue of magnetic flux to distinguish & separate the flux of each of the poles before gating & guiding these fluxes around their respective lobes. --Now periodically interrupted/redirected flux is added continuously into both lobes by dual magnets so it is the <u>full flux adder</u> Enhanced Transformer (ET-2).

4. Flux Deflection Buttons

You may have surmised (like a chess game kibitzer would,) that P-M's of opposite polarity placed oppositely on a core would flux saturate that core location making the idea inoperative? The saturation situation solution, DeLain's Deflection Button, button magnets positioned for flux deflection and utilized to isolate all poles. Fixed in place, interposed, equipoised and counterpoised to opposite polarity poles (at both P-M poles) with all like poles in proximity, antipodal thereby deflecting all flux and preventing unlike pole linkage, as well as any core saturation points. (Fig.4#15a) The DeLain deflection button magnets can be P-M's, E-M's, or superconducting pellets, --Now increasingly more feasible. Applicable here because its technically advanced principle "perfect diamagnetism" (meissner effect) is the button station requisite; a direct desideratum. The recommended E-M's are flat coils inspired by the Tesla spiral coils, see U.S. patents 725,605; 723,188; 649,621; 645,576; and 593,138, but the difference is that DeLain deflection button spirals are rectangular, core conformal and employ a square or rectangular magnet wire (commercially available). This type wire markes the best single layer rectangular spiral coils.

(Fig.#15b) The highest quality P-M's are necessary for this location. Whichever magnet type is used for the DeLain deflection button -strong is required, thin is to be desired (high energy density, minimal thickness)! Its dimensions may be limited by the core width but should exceed that of the pole faces and extend to the aperture of the yokes' inductances (Fig.4#15a). The amorphous metallic glass tape core may be used to wrap the DeLain deflection buttons into the required fixed position as this maintain overall core cross section area dimensions with respect to confined flux density.

ARTICLE IV - detail

The core still constrains all flux for any button applied. This fact together with contraposed DeLain deflection buttons cause circumfluent flux waves by forming Neutral Zones (W.W.Gary U.S.Pat.190,206) and Null Regions (V.A. Misek U.S.Pat. 2,862,188) between like polarities in proximity. The DeLain designated Null Zones (DNZ), are these infinitesimal demarcation lines, dehiscing dictates of natural law used to separate the various flux sources like lubrication between moving parts (that are non-motional). They enhance flux wave oscillation by removing all extraneous and inhibiting attractive forces, allowing the DeLain deflection Yoke instantaneous control, complete and dominate over all flux in the core.

5. CALCULATING I/0 OF FULL FLUX ADDED ENHANCED TRANSFORMER (ET-2)

A simultaneous deflection of dual P-M flux is made duolobate as well as bidirectional for any $\lambda/2$ in this case, which makes K_{phi} an undiluted ratio for P-M's of equal strength. Transformer loss remains .2, as losses for 100 % core (ratio) flux is always equal to, or

less than, losses for 100 % core (E-M) flux. By controlling the engineered specifications for K_{phi}, the flux mix ratio, may be varied as 50 % E-M to 50 % P-M flux is $K_{phi}=1$, so too E-M to P-M flux percentages of 33to67=2, 25to75=3, 20to80=4, for K_{phi}= 2, 3; 4, etc., are also made practicable. This shows that: as the flux ratio ϕ_{p-m}/ϕ_{e-m}, >> 1 the I_{out}/I_{in} ratio gets >>1, and so K_{phi} becomes an increasing gain function where the ratio of the magnitude of a steady state output waveform is increasingly positive, relative to electromagnetic input.

TWO CASE: K = 1.8, 2.8, 3.8, 4.8, etc. or as engineered

For the edification of Kirchhoff consciousness devotees, genesis (Fig.8) the static snapshot. Also a dynamic summing can be calculated in the complex exponential form using the natural logarithmic function(e), the mathematically imaginary direction of the operator (±j), the pseudo angular velocity (^{w}) of its phase relationship, with respect to time (t), all descriptive of the dynamics of the electromagnetic flux input (ϕ_{e-m}), which is added to the real but magnetostatic permanent magnet flux vector (ϕ_{p-m}), resulting in an elevated amplitude for total sum flux (ϕ_s) and a unified quasi-dynamic motion --$\phi_s e^{jwt}$. Terms in a form recognized and familiar to engineers. That is, P-M flux is moved from time-independence, time invariance, into time-dependence, time varying and as such it can now periodically induce itself into the load or secondary windings. The value and magnitude of the actual output is the real part of the equation which is the solution to $\phi_s e^{\pm jwt}$ for some instantaneous time (t).

IN THIS CASE: K = $POWER_{out}/POWER_{in}(e^{jwt})$ -- a frequency

function output now --increases with higher frequency.

Throughout the calculation portions of this application there is no effort to be rigorous, invention is the focus --not mathematics as the complete formal analogy between electrical and magnetic circuits has been delineated in their common mathematical treatment by Maxwell's equations. Additionally, a reminder that relativistic force transformation equations show Lorentz force law is a transformation of Coulomb force equations, and time-varying electric & magnetic fields are defined as constituent parts of Lorentz force which satisfies Maxwell's equations. There is an attempt to be clear, concise, complete, so as to be sufficient to illustrate that within the context of known laws of physics the forces and energies described are calculable, applicable, and demonstrate the reality of ET over unity.

6. PERMANENT MAGNET PROTECTION - METHODS

Protecting P-M's is required to prevent both oscillation & thermal degaussing. Degaussing gradatim has never been delineated with definitude for P-M's thus by definition "indefinite", hence degeneration details remain debatable but to ignore, as the prior arts does, that opposing or oscillating fields and currents impact on, and disrupt, magnetic dmains, enough to degrade and destroy P-M's is to disregard reality. Protection overcomes this major disadvantage inherent in the prior art. Having recognized P-M's have a unidirectional flux field orientation that must be maintained and protected if continued usefulness as a flux source is requisite; herein described are several methods to achieve P-M protection:

6.1 passive coil(s) as a P-M shield

Passive coil(s) afford a measured protection when a coil is wrapped about the entire magnet pole to pole and this circuit closed upon itself. This forms an induction neutralizing coil, its operating principle is Lenz's Law, where under the influence of mutual induction the coil circuit reacts by producing a field opposing the propagation of another field through its axis (Fig.6a). In so doing it becomes opaque to the inducing field, or as they say, "it beats the field back". This method of self abating mutual induction offers protection primarily from inductive heating internal to the coils circumference, but oscillating bipolar fields continue at reduced strength. Current direction through the wire and helical enantiomorphism are factors that dictate electromagnetic coil (N-S) polarity (Fig.7). Reversing either factor inverts the coil's magnetic field polarity, swiching both factors negates a field change. When a single diode is used to close this coil's circuit, the coil current and its field becomes unidirectional (Fig.6a). The coil's magnetic poles due to induced direct current can now be aligned to reenforce the P-M pole polarity, so at the same instant the self-induction field is (in this case the identical mutually-induced field) opposing the inducing field it also aids P-M flux --all still in accord with Lenz's Law. Effectually good and correct but only for a half cycle. Therefore, about the same magnet a second coil is wrapped --independent of the first, also wound opposite in helical rotation (cw vs ccw), and so enantiomorphic to the first. One right-handed coil, one left-handed, (Fig.6b) circularly polarized enantiomorphs. In this second coil another diode limiting current to a select single direction of desired polarity will result in a magnetization orientation the same as the first but

from (induced) magnetizing direct current opposite in direction to the first. This forms two separate and different coils with controlled bidirectional currents but unidirectional dipoles with identical magnetic orientation.

(This is in no way a biflar winding nor should it be confused with one.) Now, one coil is activated by the expanding mutual induction flux field the other by the collapsing mutual induction flux field --all bipolar induced currents and reactions in accord with Lenz's Law -but only one magnetic field direction results. The effect of diode orientation, which reverses coil selection automatically with induced current reversal making the consequent magnetic field polarity orientation of both coils unidirectional. By design a mutual induction circuit that is itself a magnet for neutralizing bipolar oscillating fields from penetrating or degaussing the shielded P-M and thus always P-M protecting and reinforcing (Fig.6b). This technique also lends itself to operational energizing of P-M's (Fig.6b). Note, additional suppression diodes are shown (KD1, KD2), essential protection from inductive kick coadunate of square wave signal operation; (Fig.6c) outputs go to a bridge.

6.2 active coil(s) as a P-M shield

Active coil(s) are configured about P-M(s) as described above but utilize externally applied and/or induced current for self - induction, too.

6.2a An active <u>single</u> coil(s) about the P-M(s) is powered by a single or dual output winding tape via an AC to DC bridge circuit that must furnish self-induction current to said coil in excess of any possible -/+ mutually induced current impinging said coil in order to maintain a unidirectional field of DC

or pulsating DC around the P-M(s) (Fig.6c, 6e). Correctly selecting the tap level power accomplishes this.

6.2b An active double coil(s) is also wrapped with counter rotating helical windings, with pole polarity dictating diodes, (or special purpose semiconductor) and powered by mutual induction as (6.1) above. Add to this a fixed DC source so both coils have appended DC self-induction current, and each in turn is intensified by mutual induction from utilization windings. The additional and supplemental DC source comes through an AC to DC bridge energized by output tap(s), a battery, solar cell, etc., or a third (as in 6.2) coil. see Fig. 6c, 6e.

6.2c An active triple coil(s) winding wraps the P-M plus the two described inner coils (6.1), (see fig.6b) and it does the combat against the mutual induction of output windings in accord with Lenz's Law. The third coils output, through a bridge, powers the self-induction of inner coils (1&2). The self-induction fields of (1&2) are designed to exceed the mutual induction intensity of coil (3). For stability the AC to DC bridge input may also tap utilization windings, securing additional energy.
In all cases the P-M is protected from degaussing plus continually reenforced by unidirectional fields and never opposed by any (Fig.6b). Additional spike suppression diodes (KD1, KD2) capture inductive kick spikes directing them to a feedback bridge (Fig.6c) thus further protecting both P-M's and current direction diodes (D1, D2).

6.3 Utilization coils shielded
E-M radiation shields or cans of metallic glass, Mu

metal, or the like are an alternative, too. The shields over the output and input windings can suppress almost all E-M radiations. These additional shields surround the P-M's & E-M's completely so they control and conduct induced currents and fields away from the source P-M's (Fig.6d, 6e, 6f). Shielding accomplishes this efficiently, converting most of the energy to heat, consuming more power than is returned to the system. Thus it saps energy away from output circuits and reduces output efficiency. It's also difficult to utilize the little remaining energy to establish P-M protecting or reenforcing fields imputing radiation shields <u>alone</u>, do not, can not, and may not suffice.

6.4 Combinations of coils & shields

Many combinations of the above protection methods are possible and with intent implied herein. An example of one such is: A hollow core cylinder sleeve shield of Mu metal over a P-M. (Fig. 6d) This shield being dual coil wrapped and P-M reenforcing as described in passive coils (6.1) -- but the outer coil powers an AC to DC bridge. (Fig.6e) As this coil resists bidirectional E-M radiation, the bridge with ripple suppression cap. powers the inner coil continuously with unidirectional current, hence a dipole with magnetism intensified by the core cylinder, reenforcing the P-M flux while it blocks the E-M radiation from reaching the P-M. Coil <u>turns ratios</u> are selected at option to assure a unidirectional inner field of high magnetic intensity and a lower magnetic intensity outer oscillating field.

1. VARIATIONS of CONFIGURATIONS

1.1 MAGNET STACKING

There are several forms of magnet stacking. Single

unit output stacking, series and/or parallel, multi-magnet combinations into a larger single unit where the magnets can be increased while the number of coils is reduced --Horizontal. Then in vertical stacking the number of outputs can be increased for a given number of magnets. Magnets may be stacked series, parallel, vertical and/or horizontal.

1.1a Individual enhanced transformer units, manufactured to the same overall specification, should be viewed as AC batteries as they can be stacked or combined into packs, in a very similar fashion to that which is done presently with DC batteries. That is, an ET (or AC battery) can be connected in series to gain higher voltages or alternatively in parallel to increase output current. As magnets are providing the power, this is magnet output stacking.

1.1b In the horizontal stacking configuration, an example would be, four (4) ET core units where the cores are stacked side by side at right angles to each other. This forms a (cube like) square of the ET units. Here again, magnets are in the center position. All secondaries are wound about the legs where two adjacent cores meet, what would be the normal secondary position and this creates only (4) four secondaries for four (4) core units. There would be eight (8) yoke collars and (8) eight pair of magnets in this variation. The benefits is in the output, as the number of magnets enhancing each output secondary is two (2) instead of one. Four units forming a cube is practical and easily described, but horizontal stacking need not be limited to four units.

1.1c In the vertical stacking form, an example would be, where four (4) ET core units are stacked one on

top of another having the internal magnets in line and N-pole facing S-pole, so by necessity separated by a DeLain deflection button. When the end core units are closed around and back upon themselves, all four (4) cores again form a cube like box of four ET units. Each yoke collar (a two coil unit surrounding a magnet) is wound around the legs of two (2) adjacent core units. This is accomplished for all adjacent core legs, there being a total of only (4) collar windings for four (4) core units. Now, eight (8) legs are available for secondary windings. Result, four (4) core units, four (4) collar units, eight (8) output secondary, one (1) input.

1.2 FEEDBACK CIRCUITS

Feedback for the enhanced transformer can be positive, negative or regenerative. A typical feedback loop for the enhanced transformer would be where the output pick-off is routed back around the device to the signal input stage of the apparatus. For this return loop, the considerations are that the output tap minimize the external loading, the feedback loop design is control of the impedance, and there is attention to phase and loop delay that insures overall stability. This type external controlled feedback would not employ an amplifier stage, but would have a phase delay enabling selection of in phase or out of phase return that modifies the output amplitude.

1.2a The Enhanced Transformer is unique in that it has internal feedback possibilities. Here is where the additional core energy from permanent magnets, temporarily stored in the deflection yoke coils then released with each alternating current sign change, is utilized. This voltage and current increase can be feedback with a minimum of circuitry on the input to

control a feedback loop that is isolated from the secondary outputs.

1.3 OUTPUT VARIATIONS

1.3a series aiding coil(s) for max voltage output AC or DC (a standard type bridge rectifier may be used to convert AC to DC)

1.3b parallel aiding couplet coil(s) for max current output AC or DC

1.3c two independent outputs --one A C, -- one D C

1.3d an AC frequency tuned circuit output

1.3e multiple combinations of 1.3a thru 1.3d where two or more output coil((s) are used.

1.3f parametric circuit outputs -- as follows:

The fact that each of the individual coils of the input yoke or output secondary circuits can be tuned to a specific frequency itself, by the windings length or by adding a tuning capacitor to same, makes possible parametric oscillator variations that can be controlled. This also makes possible multiple frequency outputs, due to coil difference by design and particular coil capacitor tuning, while maintaining a single input frequency. The original input frequency, a second tuned harmonic, the sum and/or difference can then be extracted as an output.

2. SYSTEM VARIATIONS

2.1 THE TRANSFORMER MODE

In the transformer only mode, the invention without enhancement is utilized as a test instrument. With external power applied, the metered output measures voltage, current, and power. At the selected input frequency, the test measurement meter is set to zero or the reference point of the scale. Next, a

permanent magnet's poles are placed in the empty deflection yoke. The measured increase in output (P, I, E), is a measurement of permanent magnet quality; more useful than a flux meter. In this area where permanent magnet degaussing is a priority consideration, as high energy product magnet are used to power these devices, measuring magnet quality is a valuable tool and asset.

2.2 THE SELF-EXCITED MODES

The self exited modes exist when the ET unit is not tethered to any external devices that limits it from being a stand alone unit or its portability, as when it functions as a portable power unit.

An example is: when the input power is a rechargeable source like a battery. The battery provides starting power through input circuitry, like a DC powered switching circuit or a waveform/function generator, means that creates an appropriate AC signal input to the deflection yoke. The requirement being that the initial signal level overcome the keeper function of the core. Once started, the output being in excess of the input, makes it possible to recharge the battery with a fraction of the output while still powering the output load, much like an automobile generator recharging the starting battery. Beyond self-excited is cybernated --see figure 9.

2.3 A SYSTEM BLOCK DIAGRAM

The Enhanced Transformer is also a stand alone portable generator. This is accomplished with the appropriate adjunct micro circuits plus start-up sources (Fig. 9 start-up options block). As an example, available over the counter, are DC batteries and solar cells of select voltage and power. An AC

output hand cranked magneto (old style telephone ringer) also remains a unit purchase item. AC or DC inputs to the control circuits is optional.

The units in the control micro circuits block, a five step feedback loop, containing a power supply, function generator, voltage multiplier, amplifier, and isolation output/input coil to the enhanced transformer, are all electronic catalog purchase items.

1. The selected feedback tap should provide some isolation and this can be accomplished by a resistor, capacitor, and/or transformer tap which feeds a simple diode bridge (see Fig. 6e) providing AC input to DC output.

2. The DC power supply bridge output is feed to a function or waveform generator (say a 2206 or 8038 chip). This chip, or the like, can produce a sine wave, square wave, or triangle wave output with fixed or adjustable frequency for selected resistance or capacitance. The output of the function generator becomes a controlled (frequency, amplitude) signal, which is split and feed to the next two block units. First to the voltage multiplier, secondly, a square wave signal part is inputted to the base of a power transistor amplifier.

3. A standard type voltage multiplier with a diode/capacitor, per stage doubler having three to five stages with final stage smoothing and ripple suppression output will provide the emitter to collector transistor voltage necessary for the amplifier.

4. The transistor amplifier stage should be biased,

base to emitter, to match the function generator output signal. Using the output from the multiplier, the collector to emitter voltage is 10 to 15 times the signal voltage. The collector load is an output transformator.

5. The control circuits input to the enhanced transformer interface is the collector output transformer too, which provides some isolation and can be a step-up or step-down type depending on the ET design requirements.

This kind of feedback loop is possible because the ET permanent magnets can generate many times the input signal (current) power at the enhanced transformer output. Function generator signal control translates to output frequency and current control. This all runs down when the permanent magnets run down. That is why the permanent magnets must be protected.

The embodiments of the invention in which an exclusive property or privilege are claimed are defined as follows:

1. An inductive instrument (transformer like) comprising:

a core toroidal or otherwise ring of highly permeable material that forms a closed loop circuit for magnet flux;

a primary of specialized dual function (excitation/deflection) electromagnet(s) mounted on said core and wired as a single circuit unit energized by applied alternating current input signal(s) thereto;

a secondary of one or more coil(s) positioned to be responsive to the mutual induction of bidirectional fluxes of said core for purposes of electric current output; wherefore

a new transformer(s) configuration and type.

2. An inductive DeLain device with simple enhancement (ET-1) comprising:

a core circuit of material having high-gain permeability, such as amorphous metal/metallic glass or the like;

a primary of one or more electromagnetic coil(s) mounted on said core and so connected as to form permanent magnet flux deflection yoke(s) that push-pull permanent magnet flux and all magnetic fluxes within said core and whereto otherwise control said flux by a cyclically varying voltage being applied thereto;

one or more permanent magnet(s) of high energy product such as NdFeB or the like, placed juxtaposed said core therein yoked between said specialized dual function electromagnet(s), wherein magnetic flux circuit(s) are confined to said core; and therewith

additional permanent magnet flux enhancement(s) to augment current gain creating a

virtual current and power amplifier;

a secondary of one or more coil(s) mounted on said core and so positioned as to capture the mutual induction of summed electromagnetic and permanent magnet fluxes, such that AC output from said core fluxes is produced.

3. An inductive apparatus with compound enhancement (ET-2) which comprises:

a closed loop core of material having high-gain permeability, as amorphous metal/metallic glass or the like;

a primary of one or more said dual function electromagnetic excitation coil(s) mounted on said core and so connected as to form permanent magnet flux (DeLain) deflection yoke(s) that push-pull permanent magnet flux and magnetic fluxes within said core;

two or more permanent magnet(s) of high energy product such as NdFeB or the like, placed juxtaposed the core and thereby yoked between said specialized dual function electromagnet(s), whereby multiple magnetic flux circuit loop(s) are formed and confined to said core; and wherewith

permanent magnet flux enhances the complete core ring over full cycle, maximizing increased current gain and power output;

a secondary of one or more utilization coil(s) mounted on the core and located to capture the mutual induction of summed bidirectional electro-magnetic and permanent magnet fluxes thereby providing AC output from said core fluxes; wherewith

flux deflection devices such as button size electro-magnet(s), permanent magnet(s), and/or super conducting pellets in fixed relation to said core and so situated as to prevent localized flux saturation points within said core (these being DeLain deflection

buttons); wherefore

the Enhanced Transformer fully fluxed, being a permanent magnet "permag" generator it is a new electrical power source.

4. The inductive apparatus of claim 3 further comprising:

means to protect permanent magnet(s) from oscillating electromagnetic fields and counteract degaussing.

5. An induction apparatus (an Enhanced Transformer) comprising:

a mutable core having four continuous arms;

an input winding(s) comprising four separate inductive coil sections being serially connected and additive in electro-magnetic flux produced thereby, wherein two of the input coils are located on a first core arm, and wherein two of the input coils are located on a second core arm opposite the first core arm with a preselected distance therebetween; and

an output circuit winding(s) comprising two separate coil(s) electrically interconnectable wherein a first output coil is located on a third core arm connecting the first and second core arms and wherein a second output coil is located on a fourth core arm opposite the third core arm and also connecting the first and second core arms; and wherein located as described said coil(s) capture the mutual induction of summed bidirectional electromagnetic fluxes thereby providing AC output.

6. The induction apparatus of claim 5 wherein the output coil(s) wiring is interconnected parallel aiding and so additive in current produced.

7. The induction apparatus of claim 5 wherein the output coil(s) wiring is interconnected series aiding and so additive in voltage developed.

8. The induction apparatus of claim 5 further comprising a first permanent magnet which is permanently fixed to the core with one pole of the permanent magnet positioned between the input coil(s) on the first core arm of the core and with the opposite pole of the permanent magnet positioned between the input coil(s) located on the second arm of the core, whereas said core is two lobe apportioned; so wherein

a magnetic circuit produced in the core electronically bifurcates permanent magnet flux into one of the two lobes of said core; and whereby the induction apparatus with the permanent magnet(s) located as described has enhanced (increased) output in alternating lobes due to augmented and directionalized flux density in the core lobe(s);

said permanent magnet(s) is also electrically isolated from the core.

9. The apparatus of claim 8 wherein the permanent magnet(s) has its pole faces located on the interior of the first and second arms of the core.

10. The apparatus of claim 8 wherein the permanent magnet(s) has its pole faces located on the exterior of the first and second arms of the core.

11. The apparatus of claim 8 further comprising:

a second permanent magnet having one of its pole faces fixed to the first arm of the core between said input coils and wherein the other pole face of the second permanent magnet is fixed to the second arm

of the core between its input coils;

said first and second permanent magnets having their pole faces of opposite polarity opposing each other with the respective first and second core arms separating the pole faces of the first and second permanent magnets; and means for preventing magnetic saturation block of said core in the first and second core arms between the opposite pole faces of the first and second permanent magnets, and said means also for deflecting the flux from each permanent magnet into separate and opposite lobes of said core, whereby the apparatus with both permanent magnets has enhanced output in both lobes of said core simultaneously due to increased and directionalized flux density in said core.

12. The apparatus of claim 11 wherein core pedestals support permanent magnets put-up substantially co-planar.

13. The apparatus of claim 11 wherein the saturation preventing and deflection means comprises deflection buttons inserted into both the first and second said core arms of the apparatus between the opposite pole faces of the permanent magnets, wherein the dimension of the deflection buttons exceed that of the pole faces of the permanent magnets and extend to the aperture of the inductance of adjacent input coil(s) segments.

14. the apparatus of claim 13 wherein the deflection buttons consist of permanent magnets with like fields opposite the fields of the first and second permanent magnets.

15. The apparatus of claim 13 wherein the deflection

buttons comprising superconducting pellets.

16. The apparatus of claim 13 wherein the deflection buttons comprise flat coil electro-magnets.

17. The apparatus of claim 8 further comprising means for protecting the first and second permanent magnets from a hostile environment whereby rapid degradation of the permanent magnet flux is prevented, and wherein the useful life of the permanent magnet is extended.

18. The apparatus of claim 11 further comprising means for protecting the first and second permanent magnets from a hostile environment whereby rapid degradation of the permanent magnet flux is prevented, and wherein the useful life of the permanent magnet is extended.

19. The apparatus of claim 17 wherein the protection means if a enantiomorphic coil pair passive system and comprises a first and second protection coil for each permanent magnet to be protected, wherein the first protection coil is wound around the permanent magnet in a left-hand helical fashion and the second protection coil is wound around the permanent magnet in a right-hand helical fashion, wherein the ends of the coils are connected to each other, whereby a field opposing any external hostile magnetic field will be induced into/by the protection coils and thus protect the permanent magnet(s).

20. The apparatus of claim 18 wherein the protection means is a enantiomorphic coil pair passive system and comprises a first and second protection coil for each permanent magnet to be protected, wherein the first protection coil is wound around the permanent magnet

in a left-hand helical fashion and the second protection coil is wound around the permanent magnet in a right-hand helical fashion, wherein the ends of the coils are connected to each other, whereby a field opposing any external hostile magnetic field will be induced into/by the protection coils and thus protect the permanent magnet(s).

21. The apparatus of claim 19 wherein the protection means is an enantiomorphic coil pair with diodes and further comprising a diode inserted in each closed helical coil to allow an opposing magnetic field to develope in only one direction for each helical coil, which direction in the left-hand helical coil is opposite that of the right-hand helical coil and wherein the magnetic pole orientation always energizes the permanent magnet it is wrapped around.

22. The apparatus of claim 20 wherein the protection means is an enantiomorphic coil pair with diodes and further comprises a diode inserted in each closed helical coil to allow an opposing magnetic field to develope in only one direction for each helical coil, which direction in the left-hand helical coil is opposite that of the right-hand helical coil; and wherein the magnetic pole orientation always energizes the permanent magnet it is wrapped around.

23. The apparatus of claim 21 further comprising a sleeve can shield surrounding each permanent magnet prior to wining of the left and right-hand helical coils.

Said sleeve can shield circuit is electrically grounded.

24. The apparatus of claim 22 further comprising a sleeve can shield surrounding each permanent magnet prior to winding of the left and right-hand helical coils;

said sleeve can shield circuit is electrically grounded.

25. The apparatus of claim 21 wherein the protection means is an active system and further comprises a power source for actively inducing a magnetic field in either or both of the helical coils to thereby oppose any external hostile magnetic fields.

26. The apparatus of claim 22 wherein the protection means is an active system and further comprises a power source for actively inducing a magnetic field in either or both of the helical coils to thereby oppose any external hostile magnetic fields.

27. The apparatus of claim 17 further comprising a feedback path from the output coils to the input coils; and

means connected within the feedback path to start and power the transformer action, whereby a self-enhancing transformer is energized; and with

means in the feedback path for modifying the feedback and controlling the input, whereby a self-controlling, self-enhancing energy transformer is developed.

28. The apparatus of claim 18 further comprising a feedback path from the output coils to the input coils; and

means connected within the feedback path to start and/or power the transformer/generator actin, whereby a self-enhancing transformer is self-

energized; and with

means in the feedback path for modifying the feedback and controlling the input, whereby a self-controlling, self-enhancing energy transformer/generator is developed.

29. The apparatus of claim(s) 27 and 28 wherein said apparatus stands in combination(s), whereas to govern inputs thereinto, regulation thereof, and control of outputs therefrom;

said device(s) being self-regulating power supply module(s).

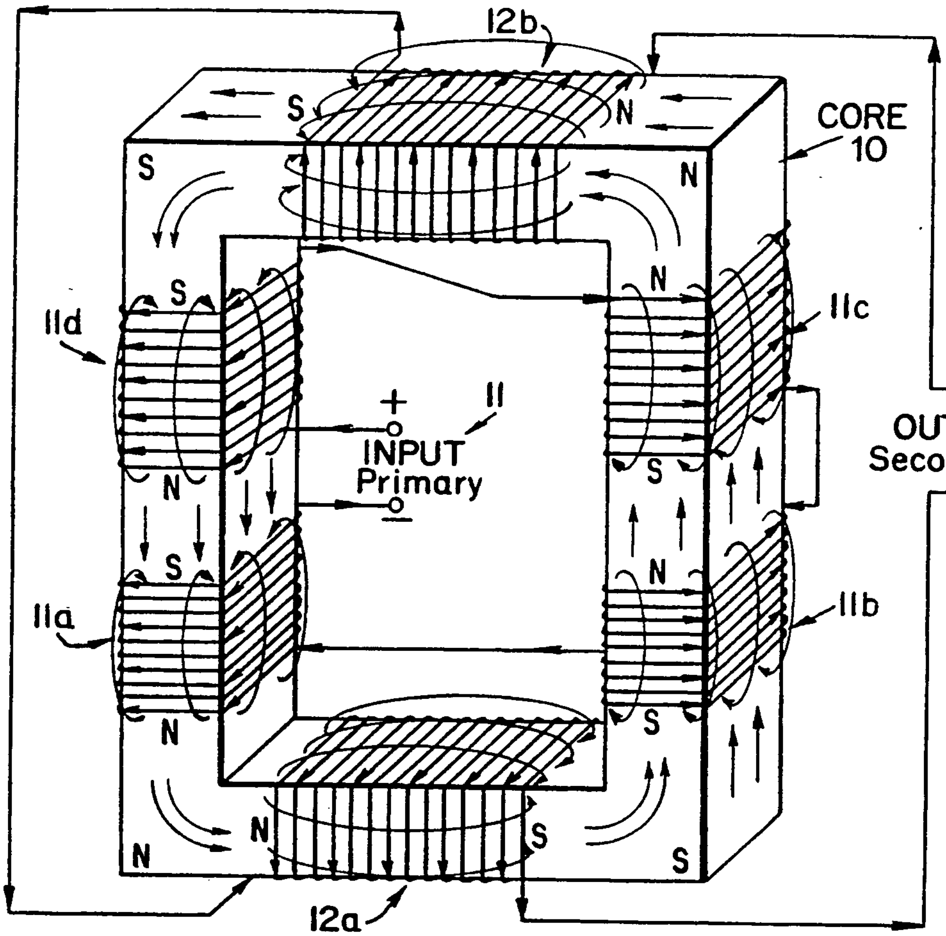

12b
S
N
CORE
10
S
N
S
N
11d
11c
+
12
+
11
INPUT
Primary
OUTPUT
Secondary
N
S
S
N
11a
11b
N
S
N
S
N
S
12a

Fig.1

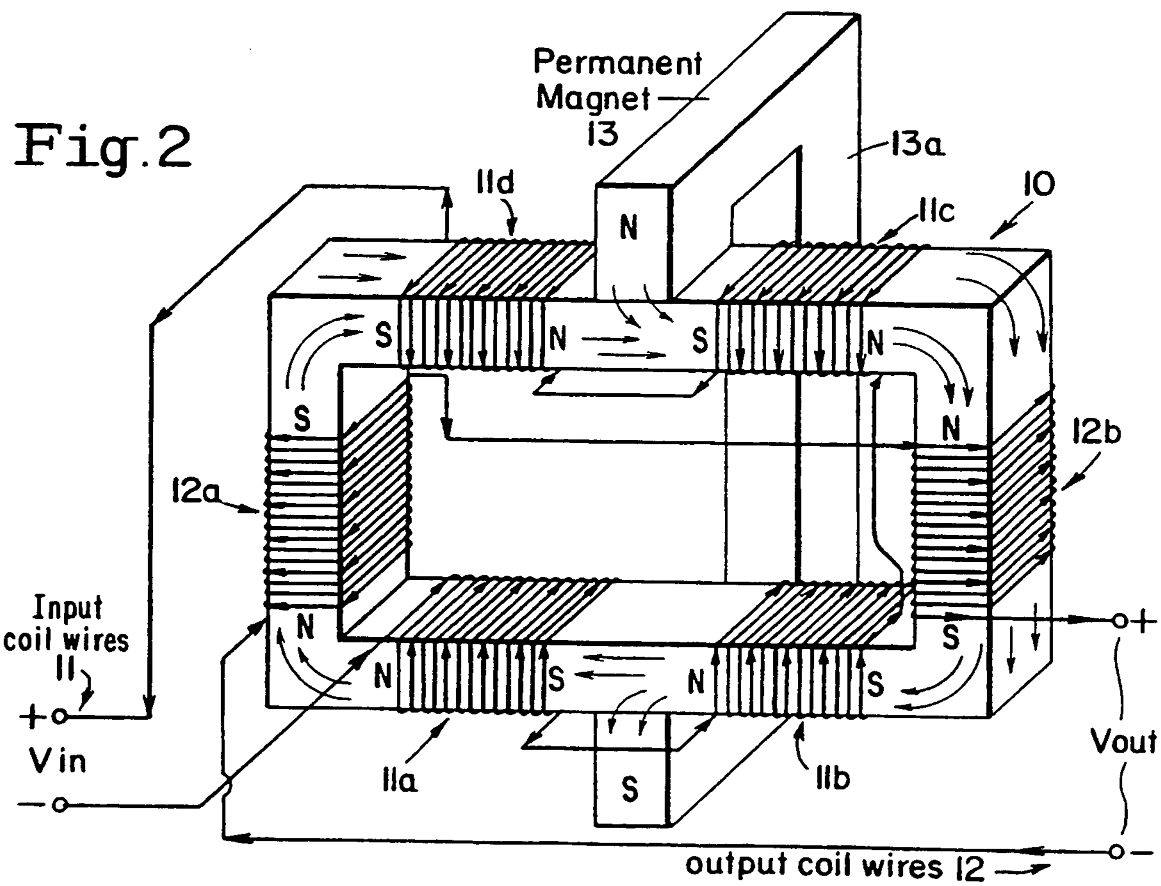

Permanent
Magnet
13
13a
11d
11c
10
N
S
N
S
N
S
N
12b
12a
Input
coil wires
11
+
Vin
N
S
N
S
N
S
11a
11b
S
Vout
output coil wires 12

Fig.2

Fig. 3

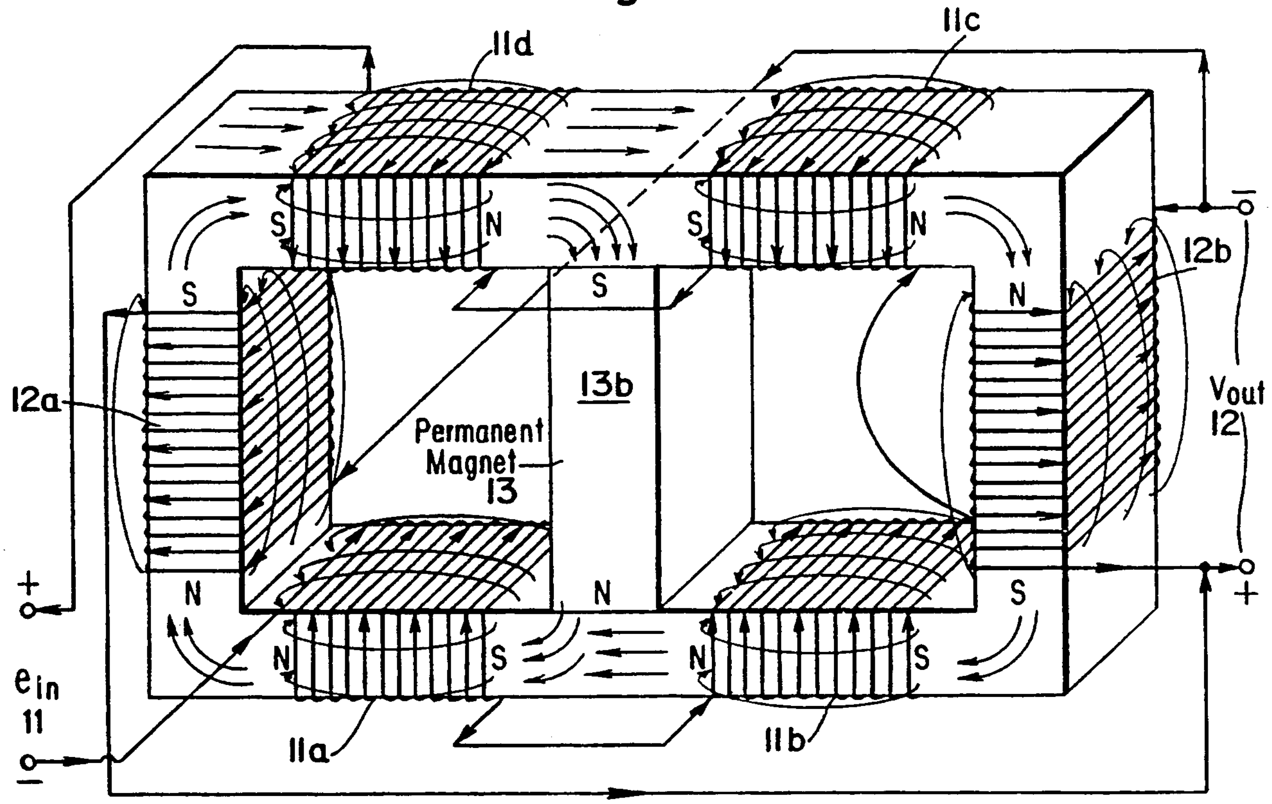


Fig. 4

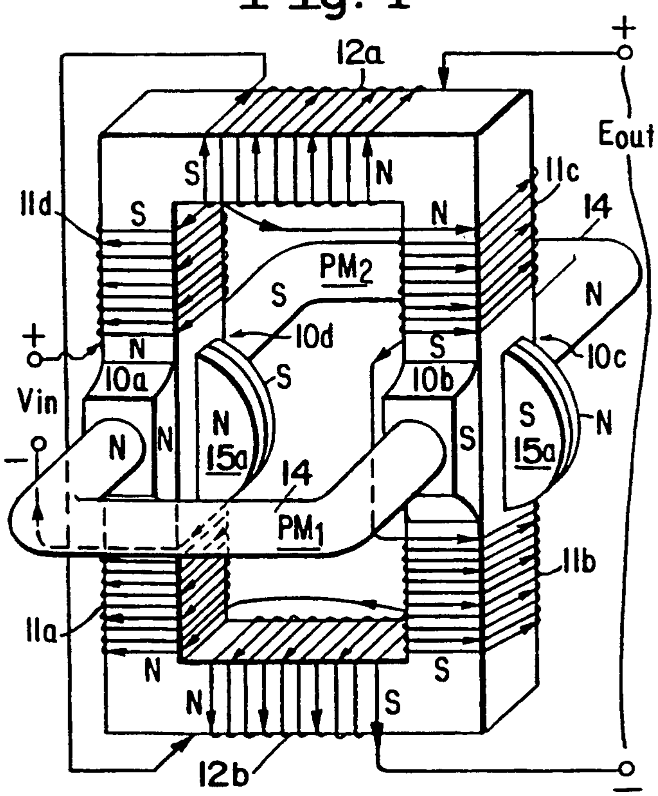
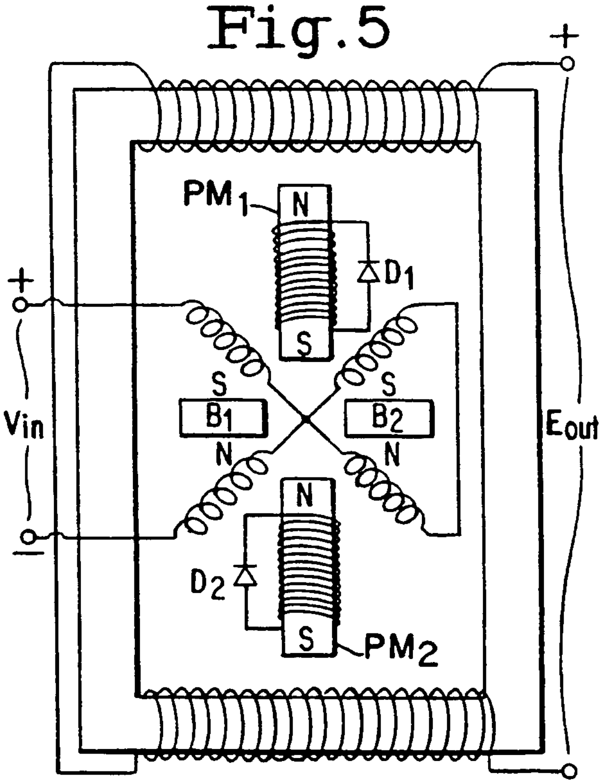


Fig. 5



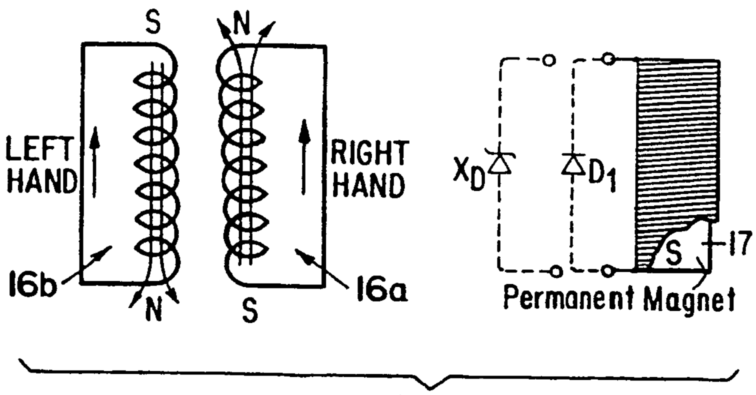


Fig.6a

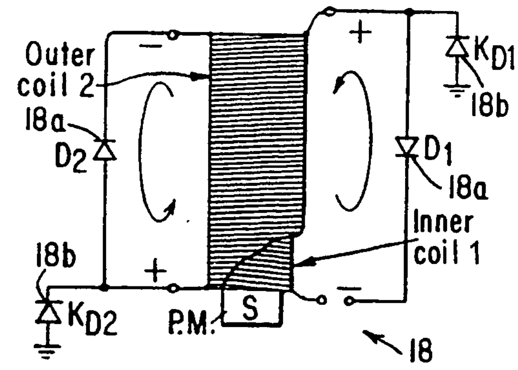


Fig.6b

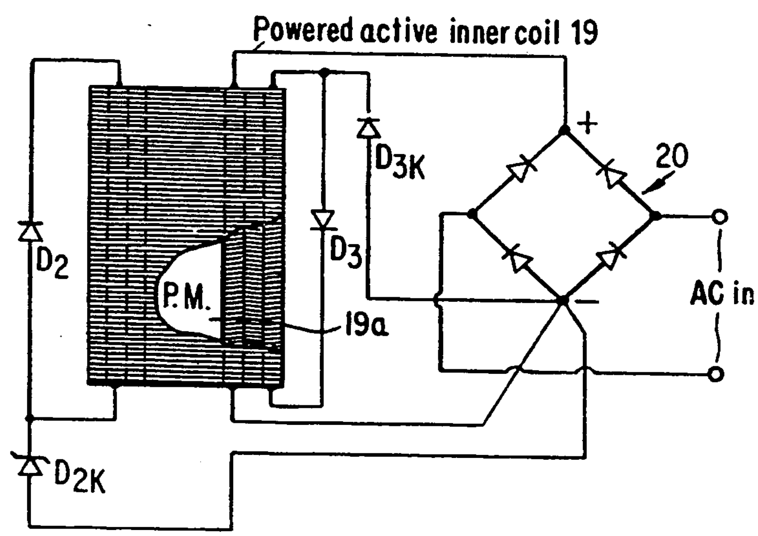


Fig.6c

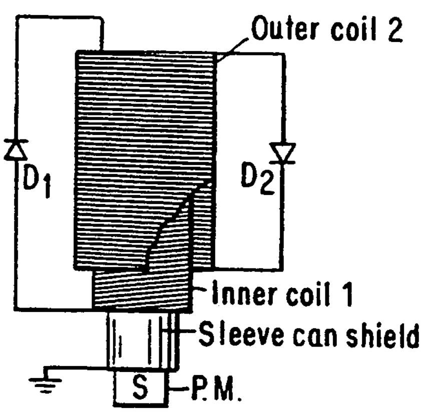


Fig.6d

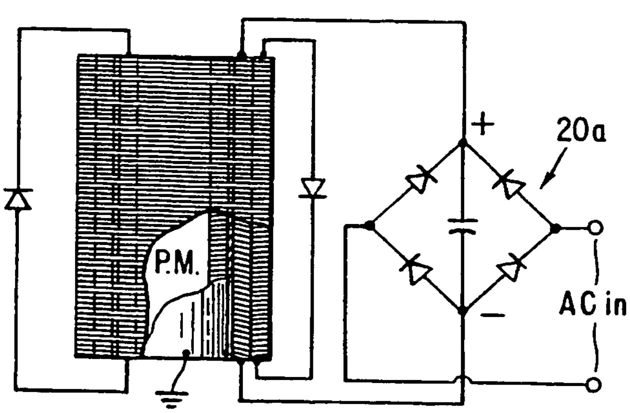


Fig.6e

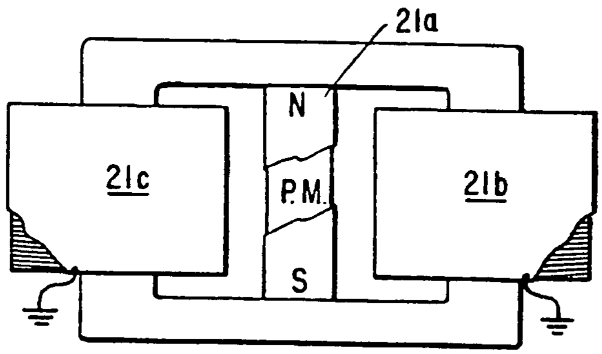


Fig.6f

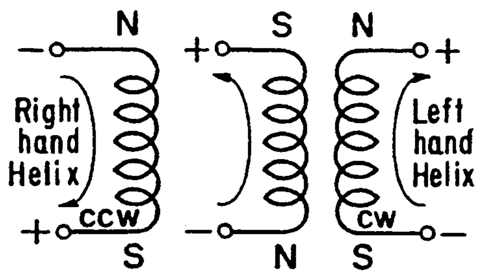


Fig.7

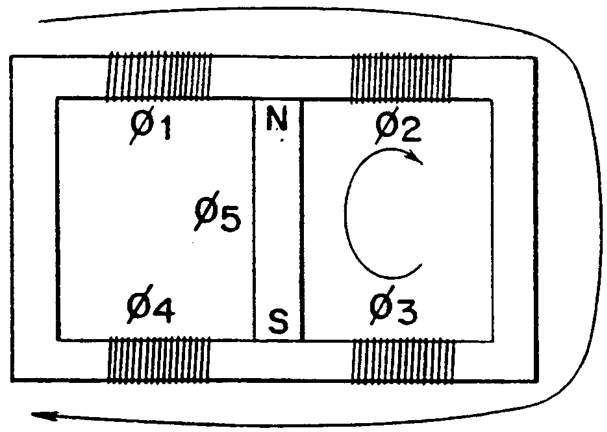


Fig.8

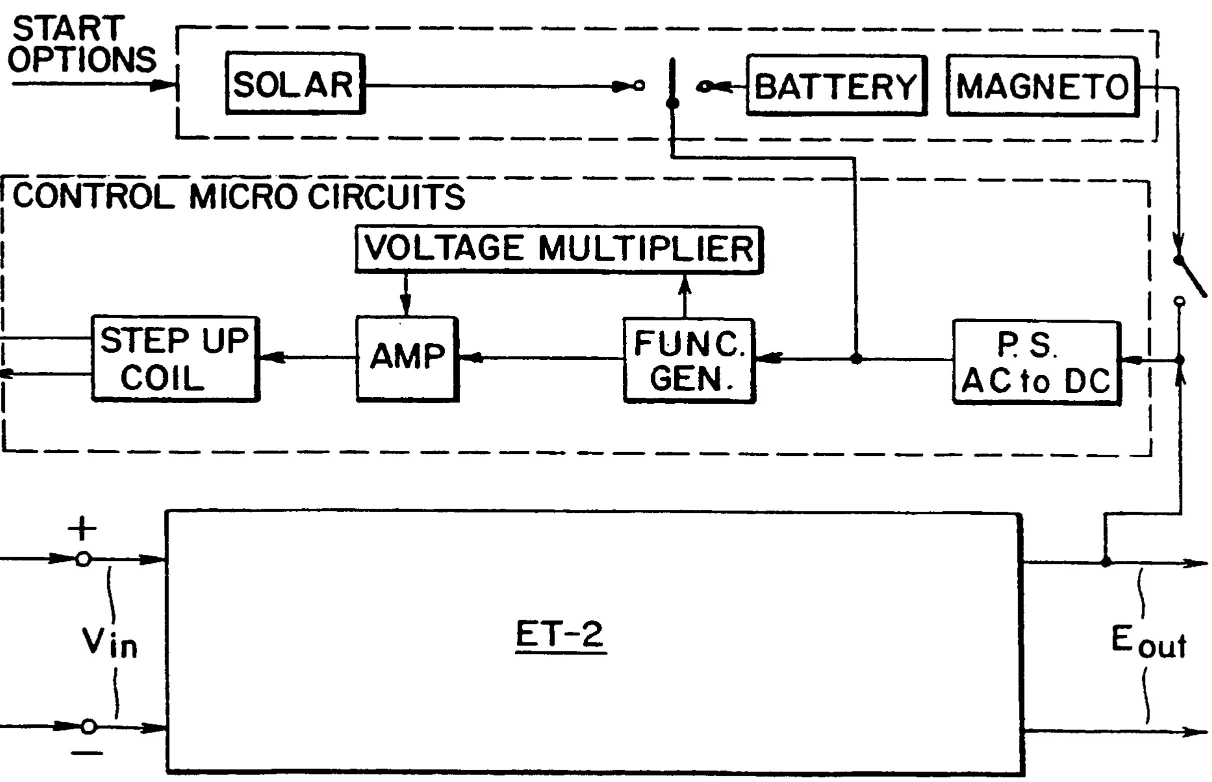


Fig.9

INTERNATIONAL SEARCH REPORT

International application No.
T/US93/06385

A. CLASSIFICATION OF SUBJECT MATTER

IPC(5) :GO5F 7/00
US CL :323/362; 336/110
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 323/362; 336/110, 184

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS
search terms: permanent magnet, core, flux, static or stationary, flux compression

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US, A, 2,443,032 (Gethmann) 08 June 1948, Figure 2.	1 and 5
A	US, A, 1,788,152 (Dowling) 06, January 1931, the entire document.	1-29
A	US, A, 4,904,926 (Pasichinskyj) 27 February 1990, the entire document.	1-29
A	DE, A, 1,488,837 (Bosco-Malvica) 13 March 1969, the entire document.	1-29

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be part of particular relevance
"E" earlier document published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search
07 SEPTEMBER 1993

Date of mailing of the international search report
13 OCT 1993

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Authorized officer
WILLIAM BEHA, JR.
Telephone No. (703) 308-1776

Form PCT/ISA/210 (second sheet)(July 1992)★